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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,565	05/03/2005	Tohru Den	03500.017772	4469

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FITZPATRICK CELLA HARPER & SCINTO  
30 ROCKEFELLER PLAZA  
NEW YORK, NY 10112

EXAMINER
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COLEMAN, WILLIAM D

ART UNIT	PAPER NUMBER
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2823

MAIL DATE	DELIVERY MODE
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06/28/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/533,565	DEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	W. David Coleman	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 May 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8,10-13,15-19 and 22-24 is/are rejected.
- 7) ☒ Claim(s) 3,4,9,14,20 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>05/05/06</u> | 6) <input type="checkbox"/> Other: _____  |

3. Pertaining to claim 1, Zhang teaches a nanostructure in the form of a mixture film which comprises a plurality of cylinders comprising Al as a major constituent, and a matrix region surrounding the plurality of cylinders and comprising Si and/or Ge,

wherein the total amount of Si and Ge is contained in a proportion in the range from 20 to 70 atomic % in the mixture film; the cylinders are orderly arrayed; the diameter of the cylinders in the range from 1 to 30 nm; and the interval between the cylinders is 30 nm and less (see Abstract).

4. Pertaining to claim 2, Zhang teaches the nanostructure according to claim 1, wherein the cylinders are orderly arrayed in a honeycomb array.
5. Pertaining to claim 5, Zhang teaches the nanostructure according to claim 1, wherein the average diameter of the cylinders is in the range from 2 to 8 nm.
6. Pertaining to claim 6, Zhang teaches the nanostructure according to claim 1, wherein the interval between the cylinders is 10 nm or smaller.
7. Pertaining to claim 7, Zhang teaches the nanostructure according to claim 1, wherein the matrix region is comprised of amorphous Si and/or amorphous Ge (see column 7, line 21).
8. Pertaining to claim 8, Zhang teaches the nanostructure according to claim 7, wherein the matrix region is amorphous Si.
9. Pertaining to claim 10, Zhang teaches the nanostructure according to claim 1, wherein the mixture film is formed on a substrate.

Art Unit: 2823

Pertaining to claim 11, Zhang teaches an electronic device according to claim 10, comprising wiring on part of the substrate.

10. Pertaining to claim 12, Zhang teaches a method of manufacturing a nanostructure in the form of a mixture film having a plurality of cylinders having a diameter in the range from 1 to 30 nm and an interval of 30 nm and less and comprising Al as a major constituent, and a matrix region surrounding the plurality of cylinders and comprising Si and/or Ge, the method comprising the steps of:

forming an ordered region for growing Al with priority on the substrate, and thereafter forming the mixture film which has Al and Si and/or Ge and in which the total amount of Si and Ge is contained in a proportion in the range from 20 to 70%, to fabricate the mixture film (please note that since the silicon can be deposited by a CVD process, it is well known that other materials are combined with the silicon such as chlorine to grow the silicon pillars).

11. Pertaining to claim 13, Zhang teaches the method of manufacturing a nanostructure according to claim 12, wherein the ordered region is a region having a honeycomb array or a pattern corresponding to part of the honeycomb array.

12. Pertaining to claim 15, Zhang teaches the method of manufacturing a nanostructure according to claim 12, wherein the ordered region for forming Al with priority includes a projection having Al as a major constituent.

Art Unit: 2823

13. Pertaining to claim 16, Zhang teaches the method of manufacturing a nanostructure according to claim 15, wherein the projection having Al as a major constituent is fabricated by anodization of a film having Al as a major constituent and etching of anodized Al film.
14. Pertaining to claim 17, Zhang teaches the method of manufacturing a nanostructure according to claim 12, wherein the method of forming the mixture film is a film forming method of forming a substance in a nonequilibrium state (please note that the gaseous state of the silicon is in a nonequilibrium state).
15. Pertaining to claim 18, Zhang teaches the method of manufacturing a nanostructure according to claim 17, wherein the film forming method of forming a substance in a nonequilibrium state is sputtering (see column 6, line 54).
16. Pertaining to claim 19, Zhang teaches the method of manufacturing a nanostructure according to claim 17, wherein the substrate temperature in film forming of forming a substance in a nonequilibrium state is 200°C or lower (please note that it is well known to form an amorphous silicon film by sputtering at room temperature which is well below 200°C).
17. Pertaining to claim 22, Zhang teaches the method of manufacturing a nanostructure according to claim 12, wherein the matrix region is Si.

Art Unit: 2823

18. Pertaining to claim 23, Zhang teaches a structure comprised by a first material and a second material, characterized in that a columnar in that a columnar member comprised by the first material is surrounded by a region comprised by the second material, that the second material in the structure is contained in a proportion in the range from 0 to 70 atomic % of the total amount of the first material and the second material, and that the columnar member is placed on a growth starting portion provided in advance.

19. Pertaining to claim 24, Zhang teaches a method of manufacturing a structure, characterized by having a step of preparing a substrate having a growth starting portion, and a step of forming a structure having on the substrate a columnar member comprised by a first material and a region comprised by a second material and surrounding the columnar member, the second material being contained in a proportion in the range from 20 to 70 atomic % of the total amount of the first material and the second material in the structure.

### ***Objections***

20. Claims 3, 4, 9, 14, 20 and 21 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. Normally it is customary to abide by the Trilateral Agreement in the prior art search in an international search report. Please note that the international search report suggested that claims 1-6 would be suggested by the prior art reference U.S. Patent 6,231,744 B1, however there is no

Art Unit: 2823

suggestion that explicitly teaches forming a SiGe nanostructure in a honeycomb. Therefore the Examiner believes that the additional prior art reference was necessary to address the present claims.

### ***Specification***

22. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Conclusion***

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:30 PM.

24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 2823

25. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, consisting of a large, loopy initial 'W' followed by a series of smaller, connected loops and a final downward stroke.

W. David Coleman  
Primary Examiner  
Art Unit 2823

WDC